PBT Service Gateway

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Outline

- **Executive Summary**
- **PBT Service Gateway Role**
- **PBT Overview**
- **HSX 6000 PBT Gateway Functions**
  - Use Case 1: PBT MPLS Overlay Gateway Function
  - Use Case 2: PBT MPLS Peering Gateway Function
  - Use Case 3: PBT to VPLS Gateway Function
  - Use Case 4: Anything (Ethernet) over PBT Gateway Function
  - Use Case 5: PBT Inter-Carrier Interconnect
- **Wireless Backhaul over PBT**
- **Summary**

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MPLS, VPLS and Beyond

Executive Summary

- PBT deployments require a gateway function to interwork with extensive MPLS and growing VPLS installed base
- PBT Service Gateway platform has strategic importance
  - Enables a complete solution by controlling the Service Gateway function – a strategic position in the face of competitive alternatives and delaying tactics
  - Plug-n-play insertion enables immediate capture of current market momentum and removes entry barriers for customer trials
  - A complete solution can define market leadership for an entire product generation

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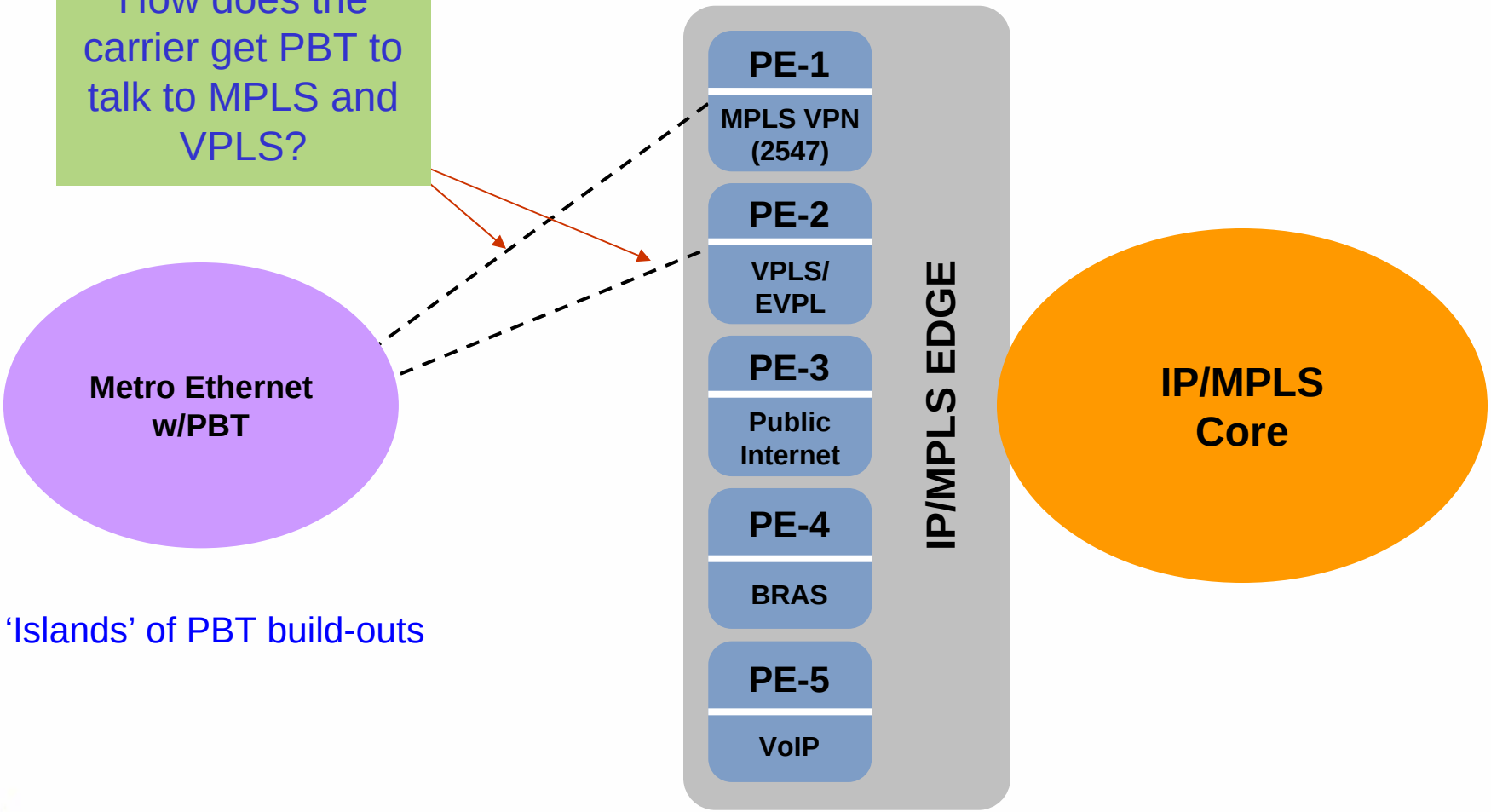
PBT's Gap with the IP/MPLS Edge

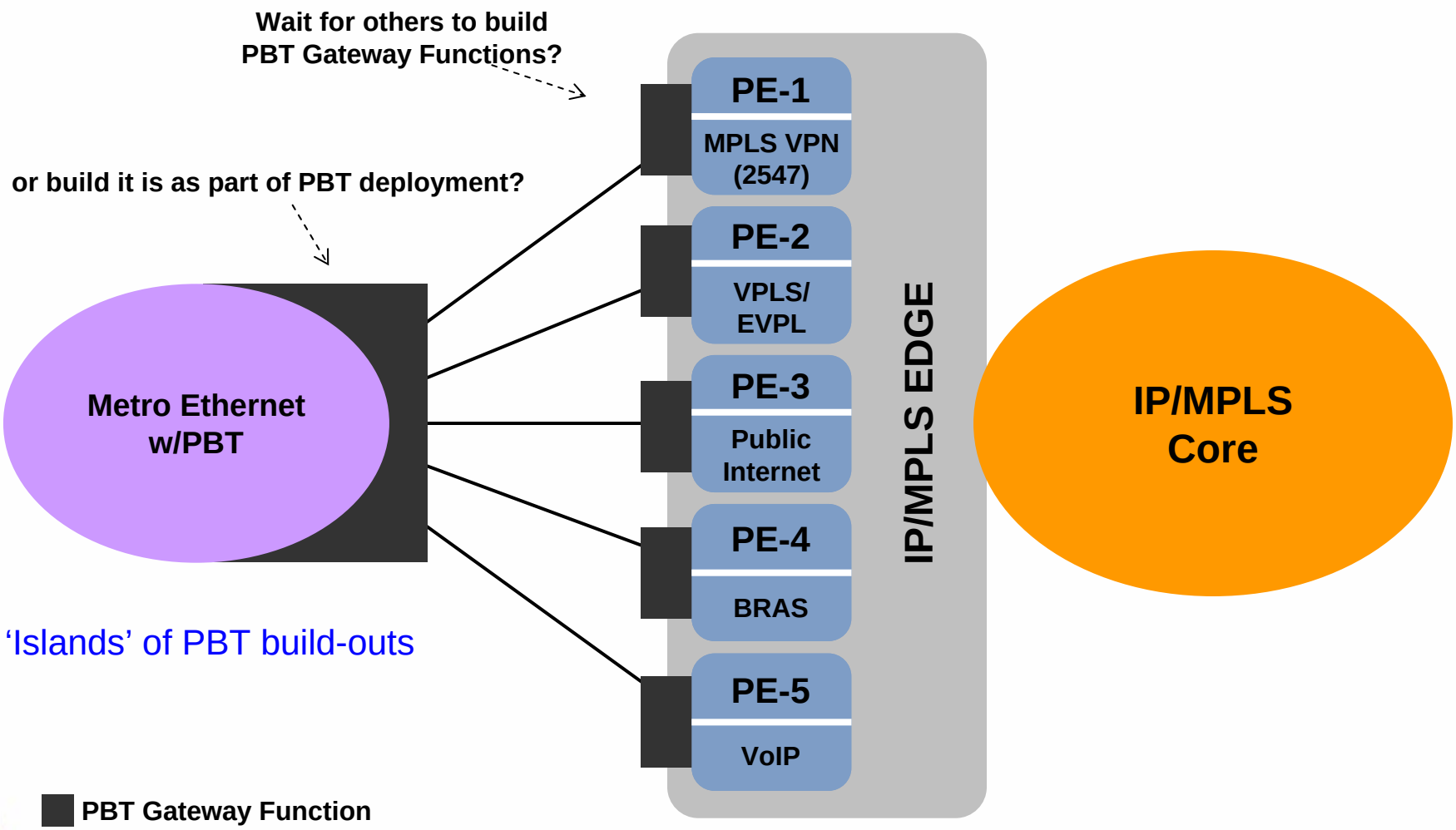
How does the carrier get PBT to talk to MPLS and VPLS?



'Islands' of PBT build-outs

Extensive Installed Base of MPLS

PBT Gateway Function Needed



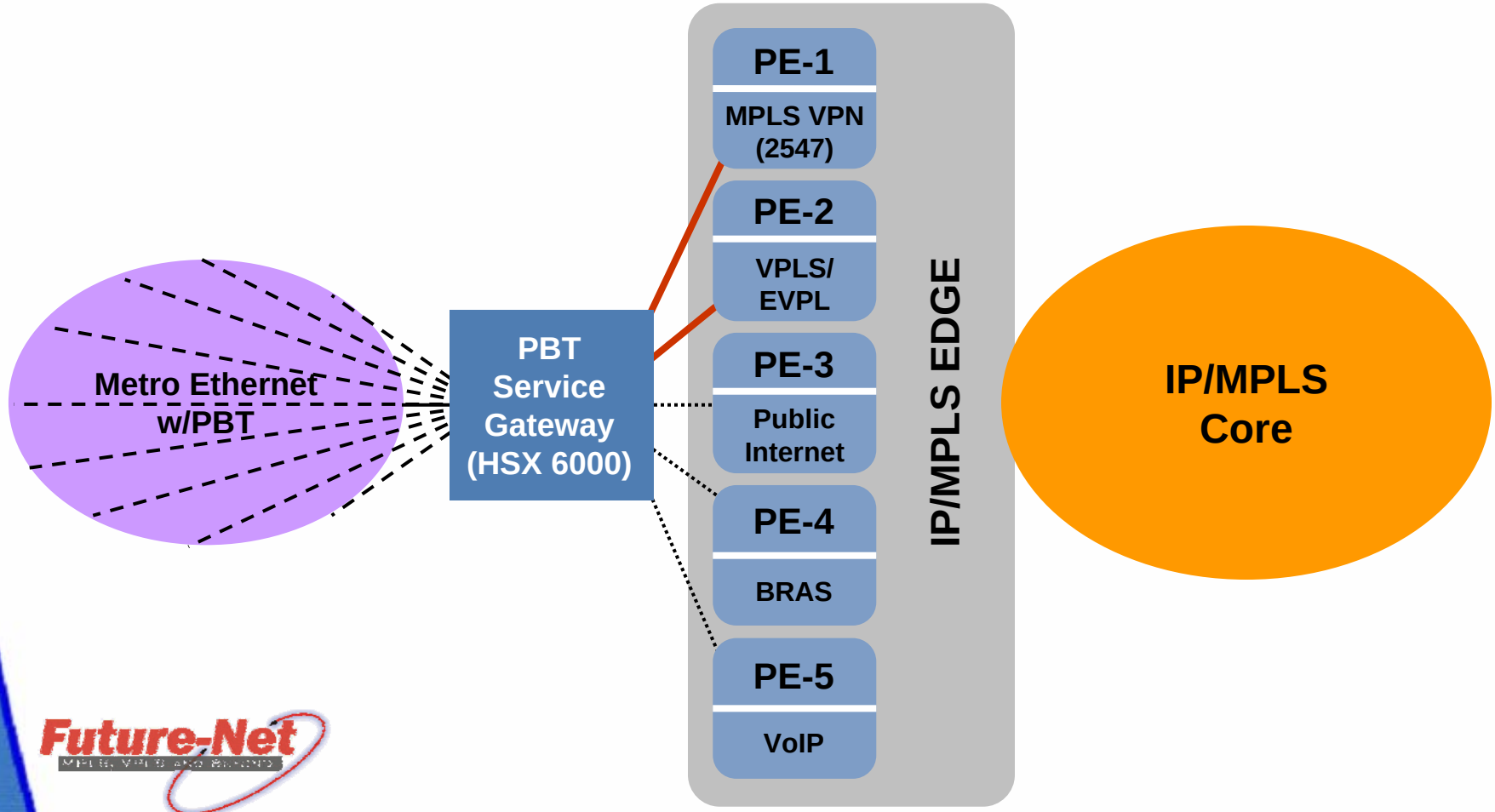
'Islands' of PBT build-outs

Extensive Installed Base of MPLS

PBT Service Gateway Platform

Advantages:

- Capture current market momentum – develop the market quickly
- Offer a complete solution by controlling the Service Gateway function – strategic position in the face of competitive alternatives and delaying tactics
- Supports PBT interworking with both MPLS and VPLS



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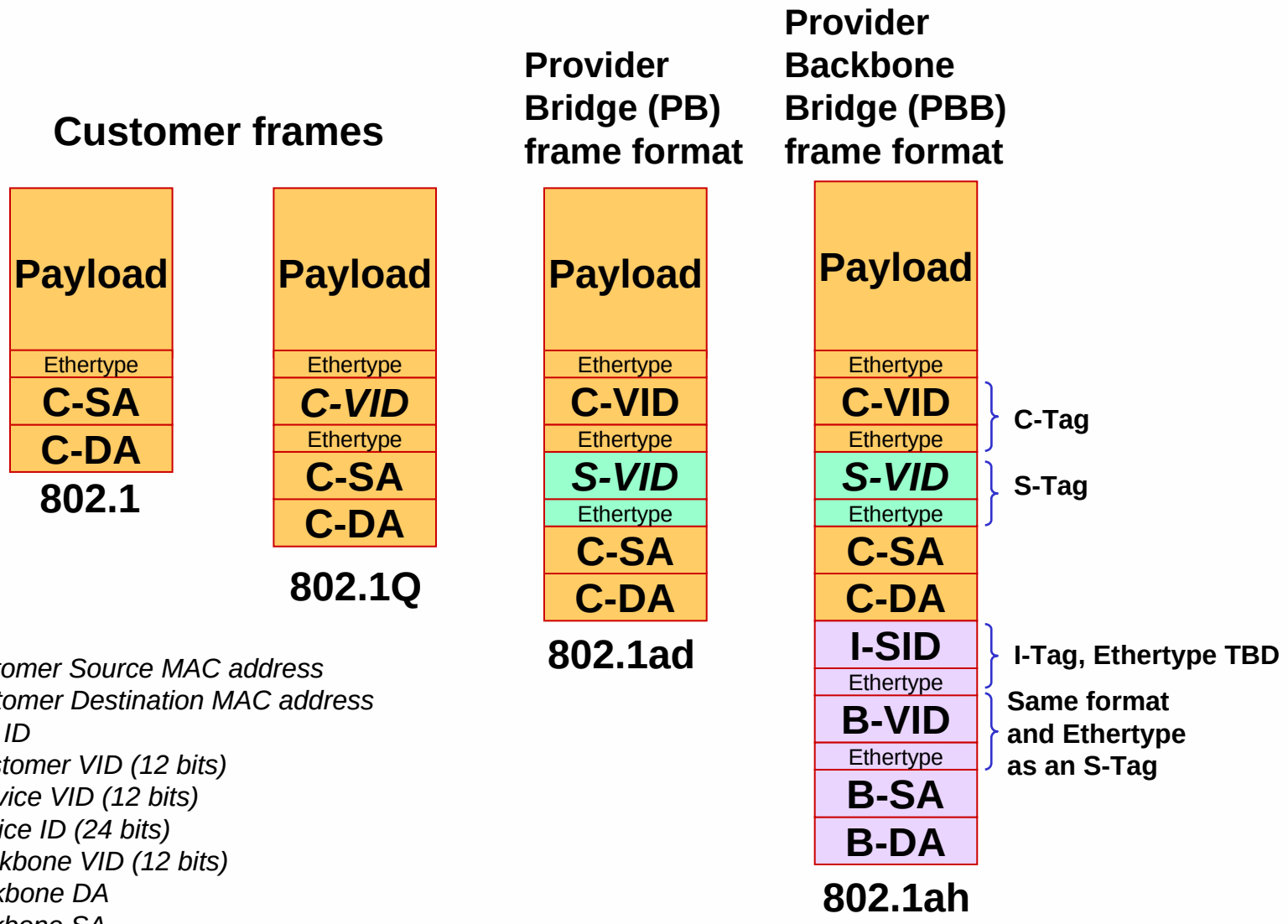
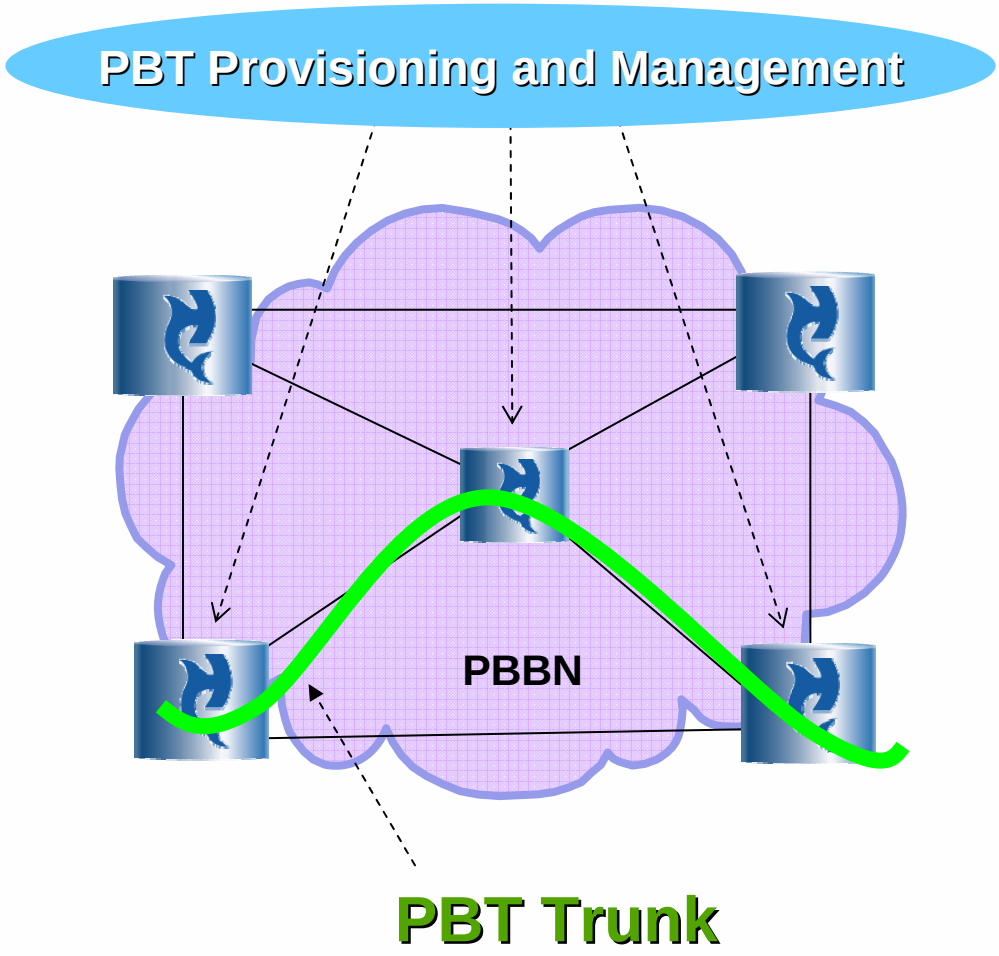
Ethernet Stacking Overview



C-SA = Customer Source MAC address
C-DA = Customer Destination MAC address
VID = VLAN ID
C-VID = Customer VID (12 bits)
S-VID = Service VID (12 bits)
I-SID = Service ID (24 bits)
B-VID = Backbone VID (12 bits)
B-DA = Backbone DA
B-SA = Backbone SA

Provider Backbone Transport (PBT)

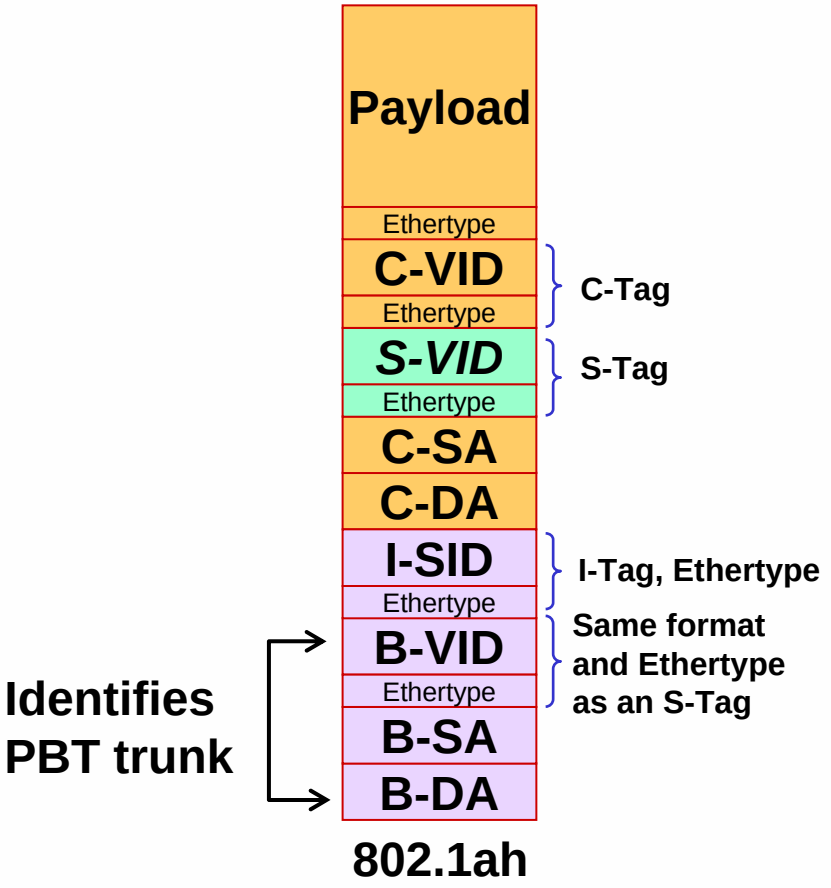
- PBT allows carriers to provision engineered and protected point-to-point trunks within the Ethernet network
- PBT operates by adding configured routes
- Each trunk is identified by a B-VID and source/destination MAC address pair



PBBN: Provider Backbone Bridge Network (802.1ah)

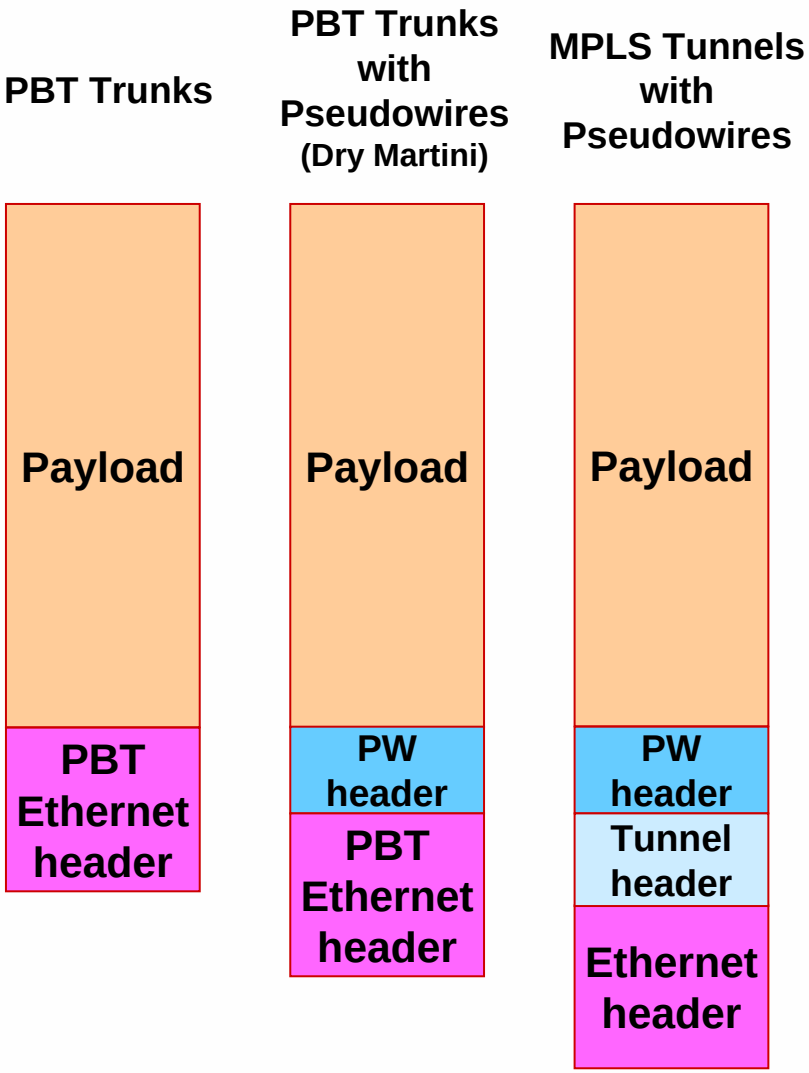
PBT Forwarding

- A set of B-VID values is reserved for PBT use
- Forwarding of non-PBT B-VIDs works as described in IEEE 802.1ah
- PBT forwarding is based on <B-DA, B-VID>, a 60-bit address
- For PBT B-VIDs, switch turns of MAC learning, STP, and broadcast of unknown B-DA
- PBT uses management plane or a control plane (such as GMPLS) to populate the switch forwarding tables
  - i.e., the mapping of <B-DA,B-VID> to destination ports



PBT and Service Layer

- PBT can replace the MPLS tunnel and work with any service layer, i.e., VPLS, VPWS, etc.



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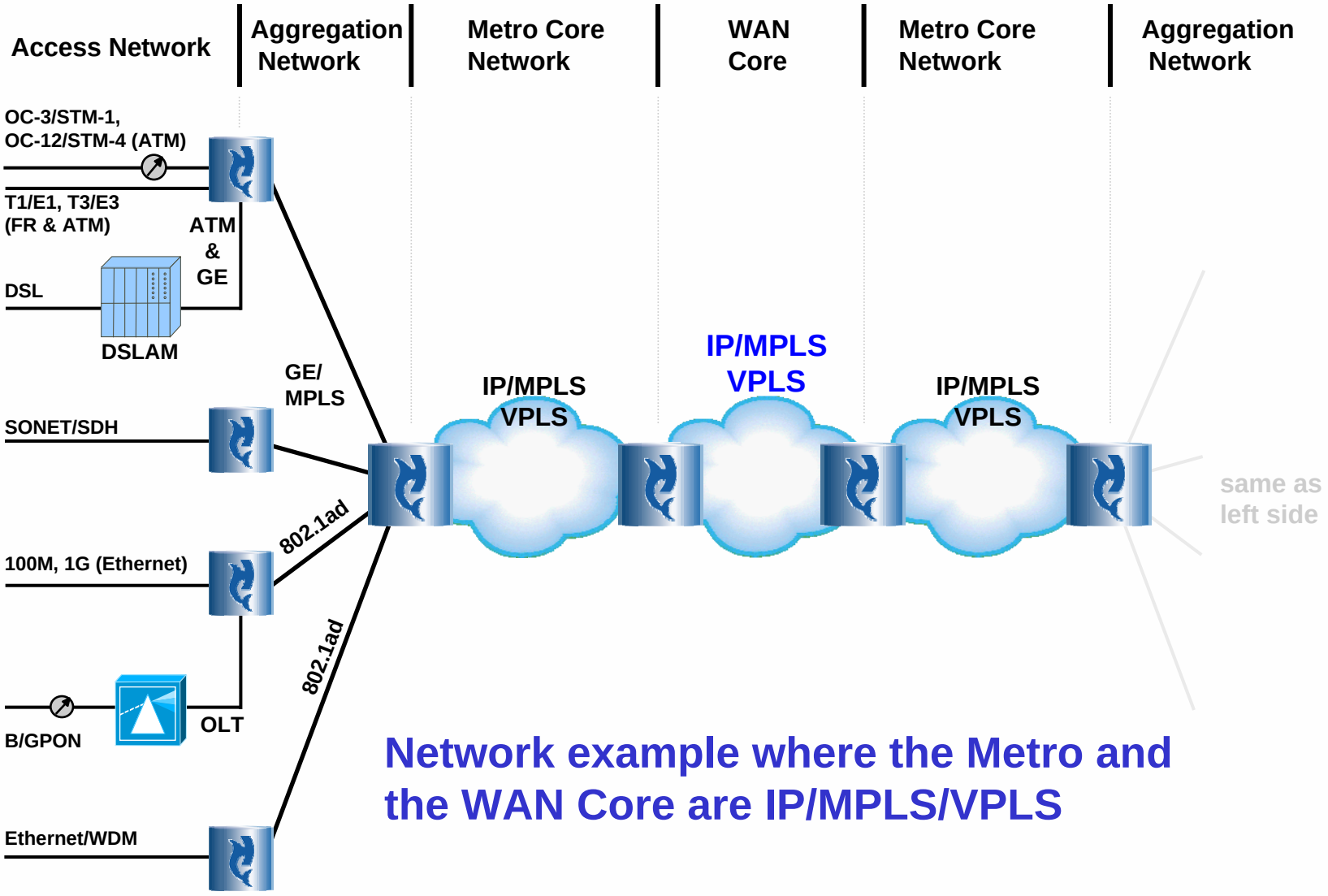
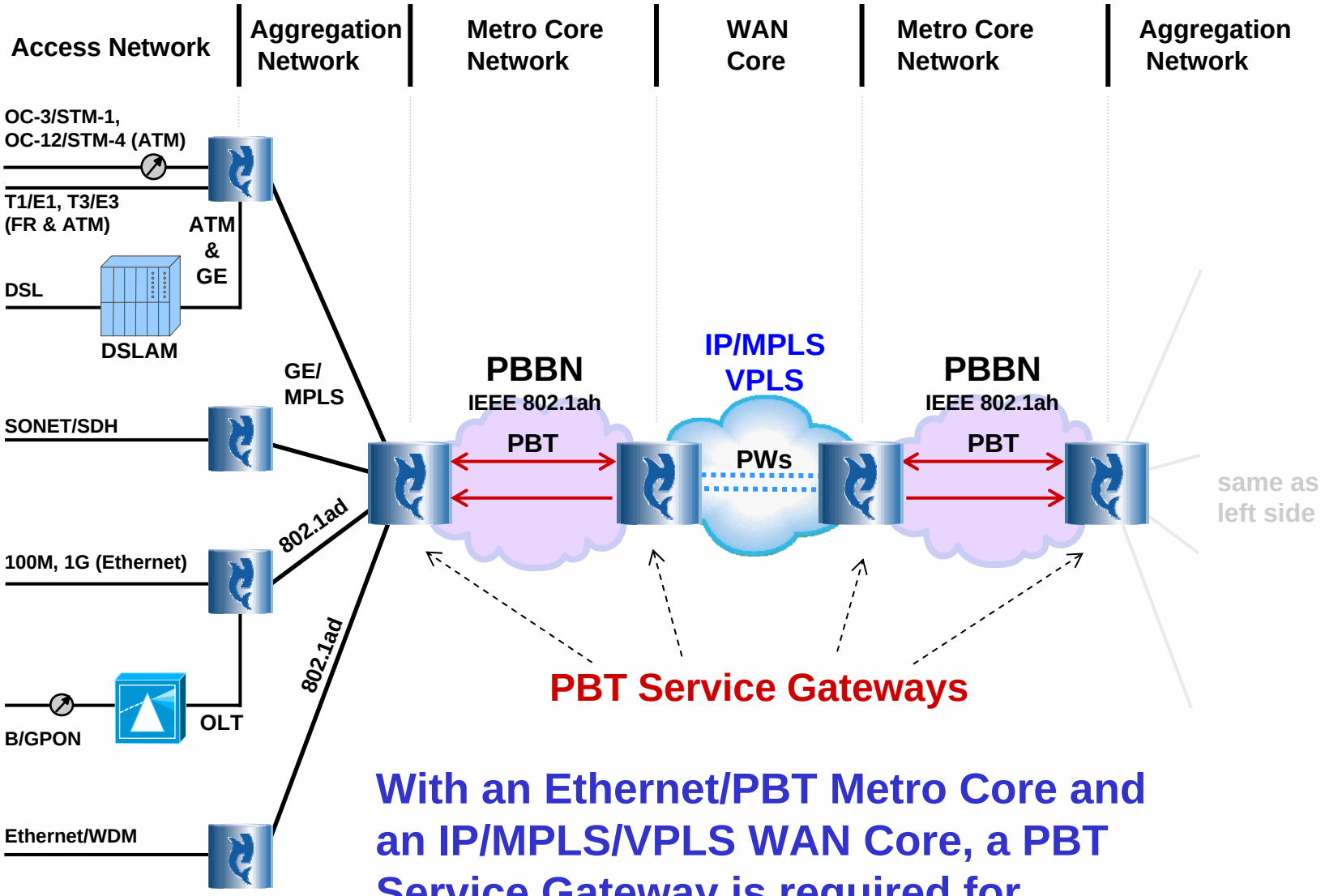
Example Network with IP/MPLS Metro and WAN Cores



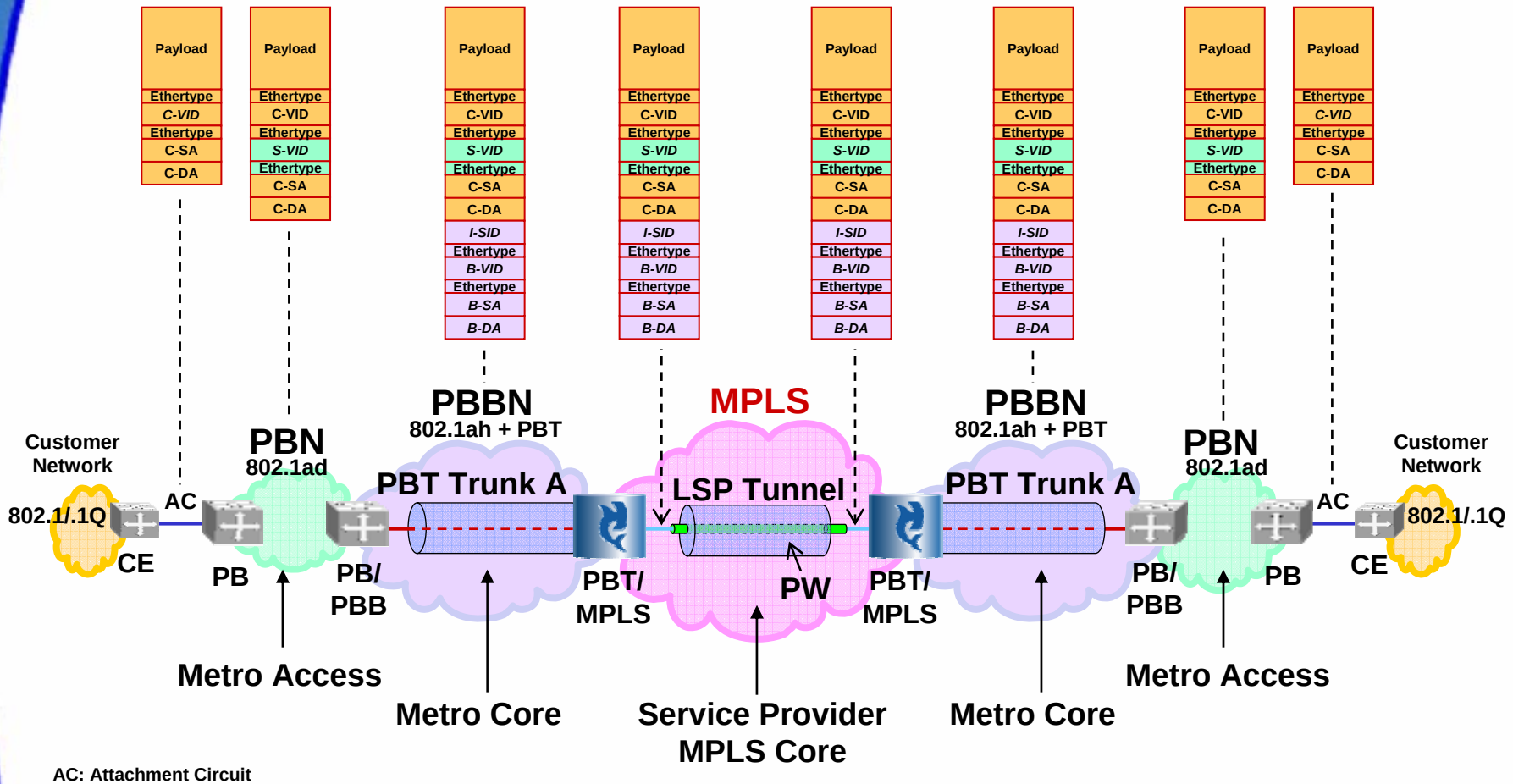
Network example where the Metro and the WAN Core are IP/MPLS/VPLS

Evolution to Ethernet/PBT Metro Core



With an Ethernet/PBT Metro Core and an IP/MPLS/VPLS WAN Core, a PBT Service Gateway is required for interworking

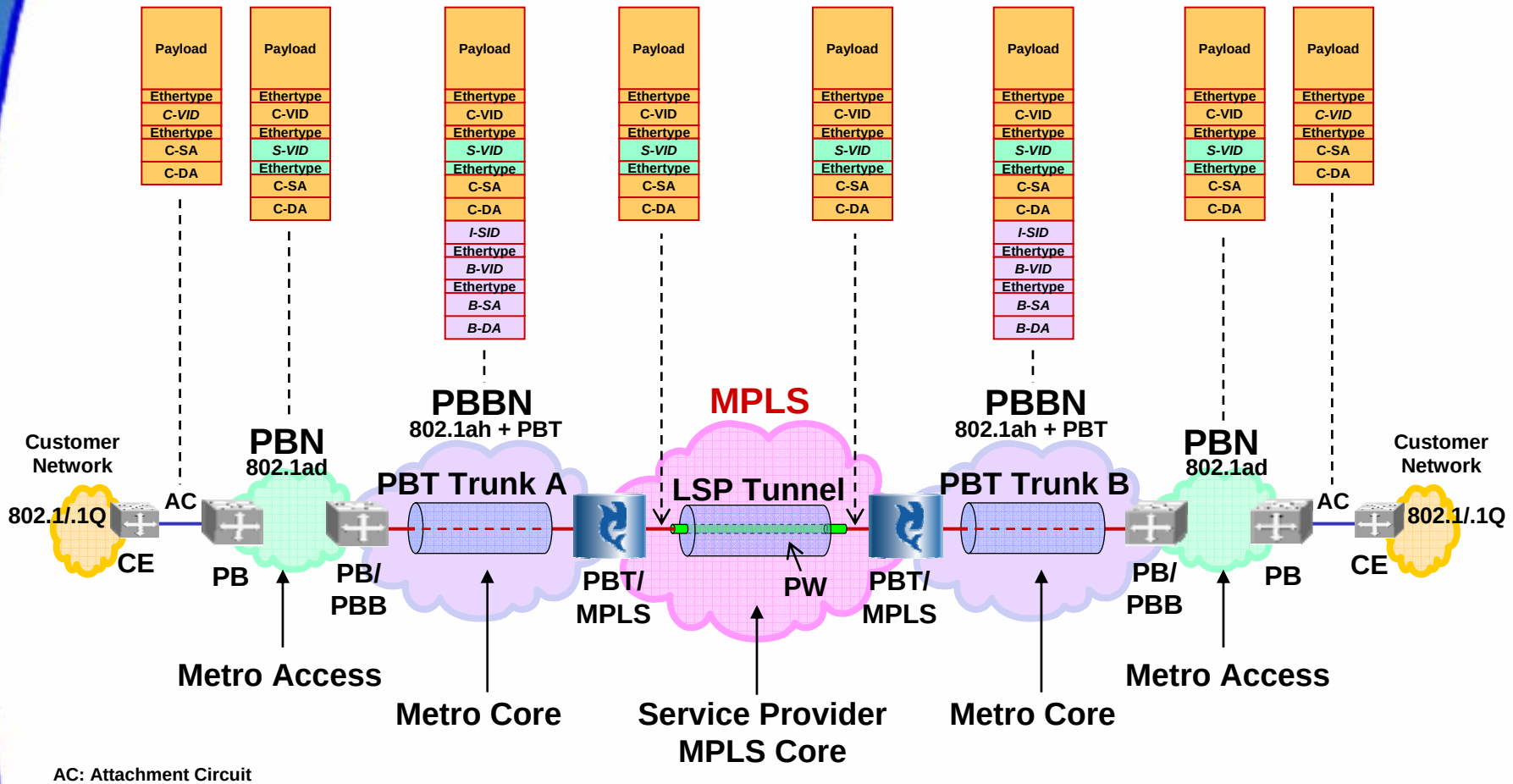
Use Case 1: PBT MPLS Overlay Gateway Function: Same PBBN Carrier



AC: Attachment Circuit
CE: Customer Edge Bridge (802.1/802.1Q)
PB: Provider Bridge (802.1ad)
PBN: Provider Bridge Network
PBB: Provider Backbone Bridge (802.1ah)
PBBN: Provider Backbone Bridge Network
PB/PBB: PB to PBB relay
PBT/MPLS: PBT to MPLS mapping

- PBT MPLS Overlay is used when a same carrier is on both sides of the MPLS network
- PBT trunks are carried transparently over an MPLS network
- PBT trunk is not terminated. PBT frames are encapsulated into MPLS Pseudowires (PW)

Use Case 2: PBT MPLS Peering Gateway Function: Different PBBN Carriers



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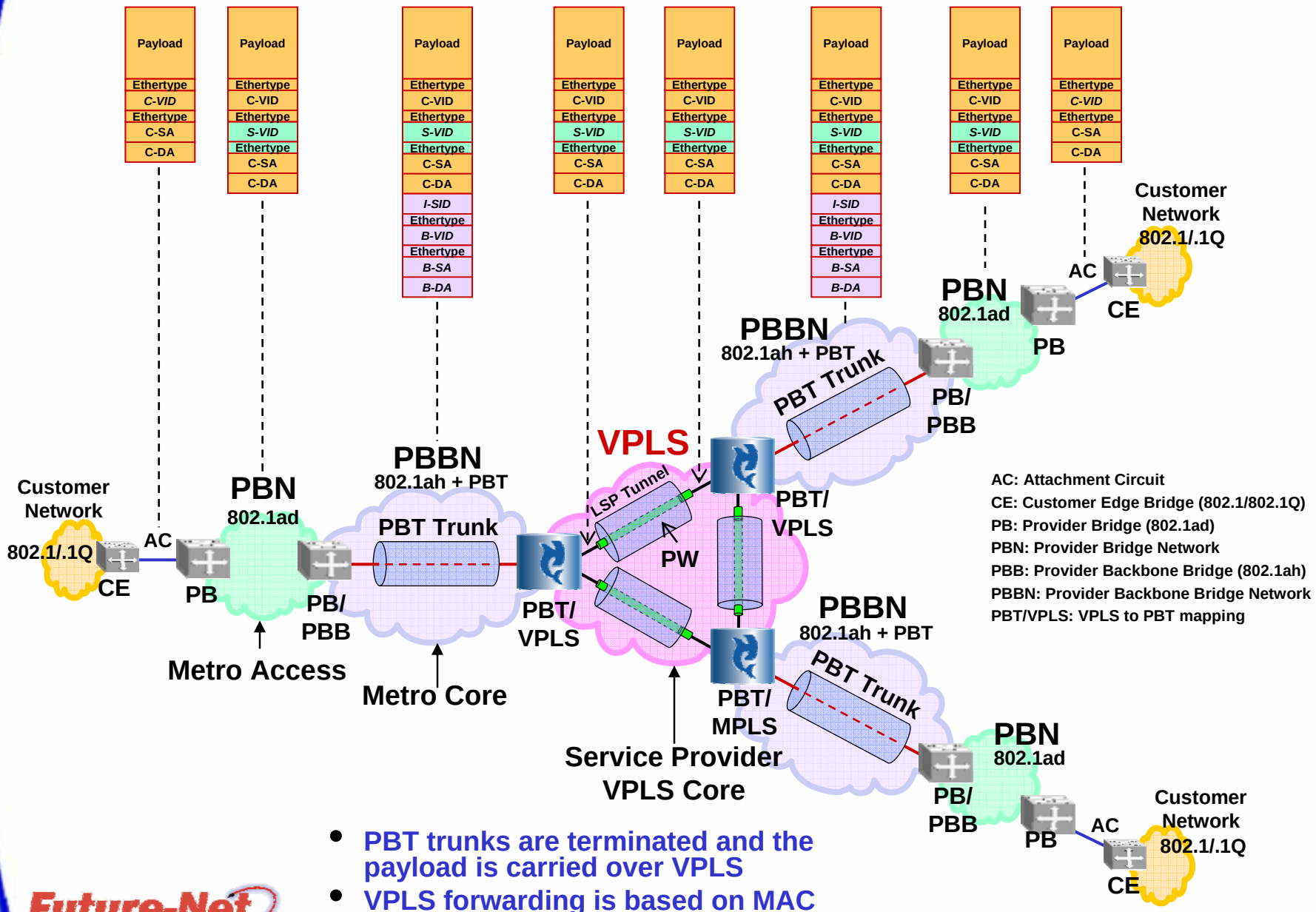
PB/PBB: PB to PBB relay
PBT/MPLS: PBT to MPLS mapping

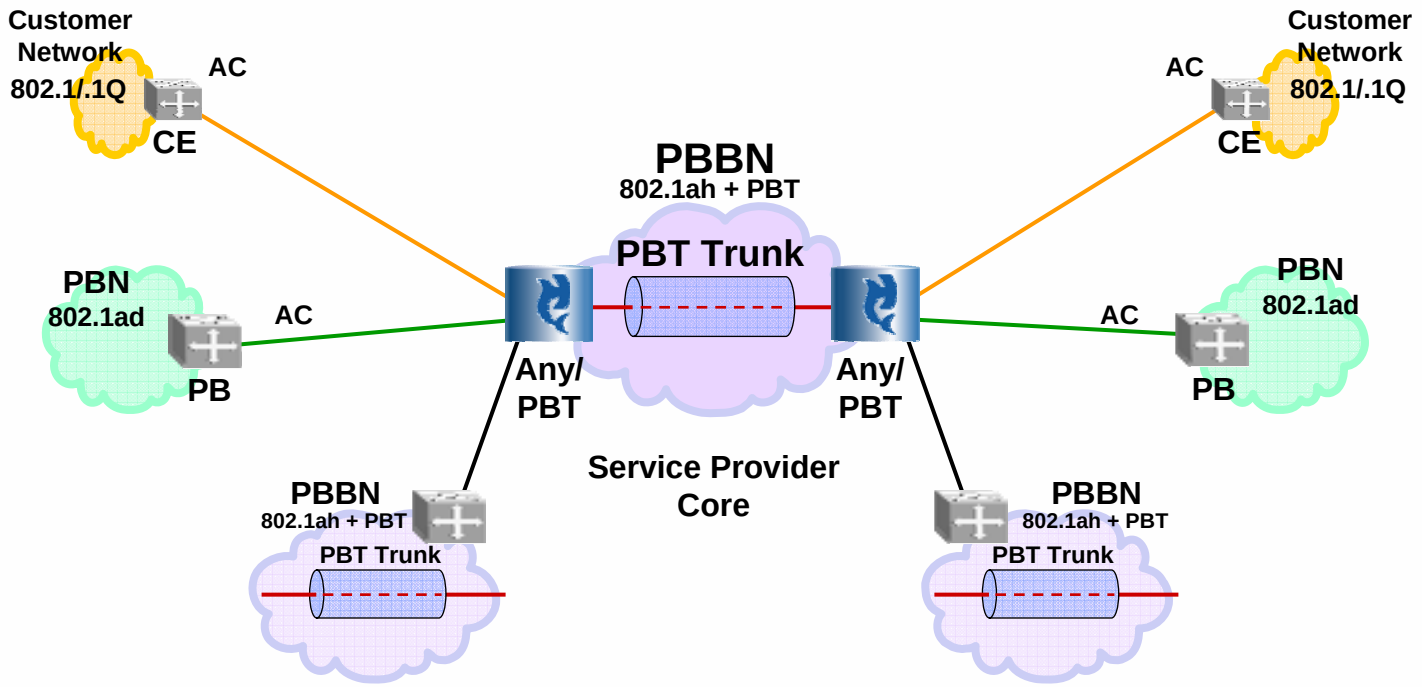
- PBT MPLS Peering is used when interconnecting PBT trunks from different carriers over an MPLS network
- PBT Trunks are interconnected over an MPLS network
- PBT trunks are terminated on both sides of the MPLS network
- The payload of the PBT trunks is encapsulated into MPLS PWs

Use Case 3: PBT to VPLS Gateway Function



- PBT trunks are terminated and the payload is carried over VPLS
- VPLS forwarding is based on MAC address learning, as usual.

Use Case 4: Anything (Ethernet) over PBT Gateway Function



- **The Anything over PBT gateway function provides transport over PBT trunks for**
  - Ethernet from direct customer attachments
  - Ethernet from Provider Bridge Networks
  - Ethernet from Provider Backbone Bridge Networks
  - MPLS Pseudowire (Dry Martini) is transparent to the gateway
- **The Anything over PBT gateway function may also provide service inter-working among Ethernet attachment options**

AC: Attachment Circuit
CE: Customer Edge Bridge (802.1/802.1Q)
PB: Provider Bridge (802.1ad)
PBN: Provider Bridge Network
PBB: Provider Backbone Bridge (802.1ah)
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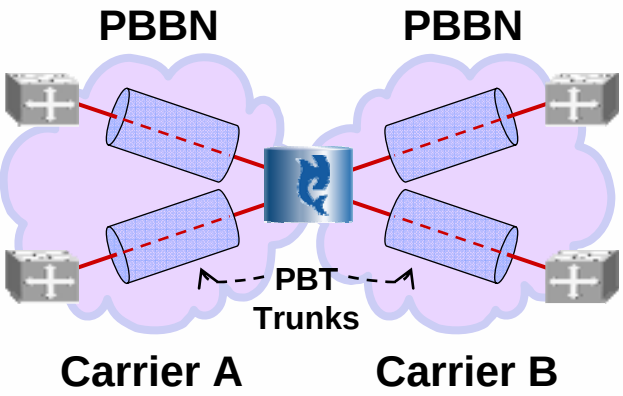
Any/PBT: Anything to PBT mapping

Use Case 5: PBT Inter-Carrier Interconnect (ICI)



- The PBT Inter-Carrier Interconnect (ICI) function is used to interconnect PBT trunks from different carriers
- PBT trunks are terminated on both sides
- The payload from one PBT trunk is mapped to another PBT trunk
- Payload switching can be provided

PBBN: Provider Backbone Bridge Network

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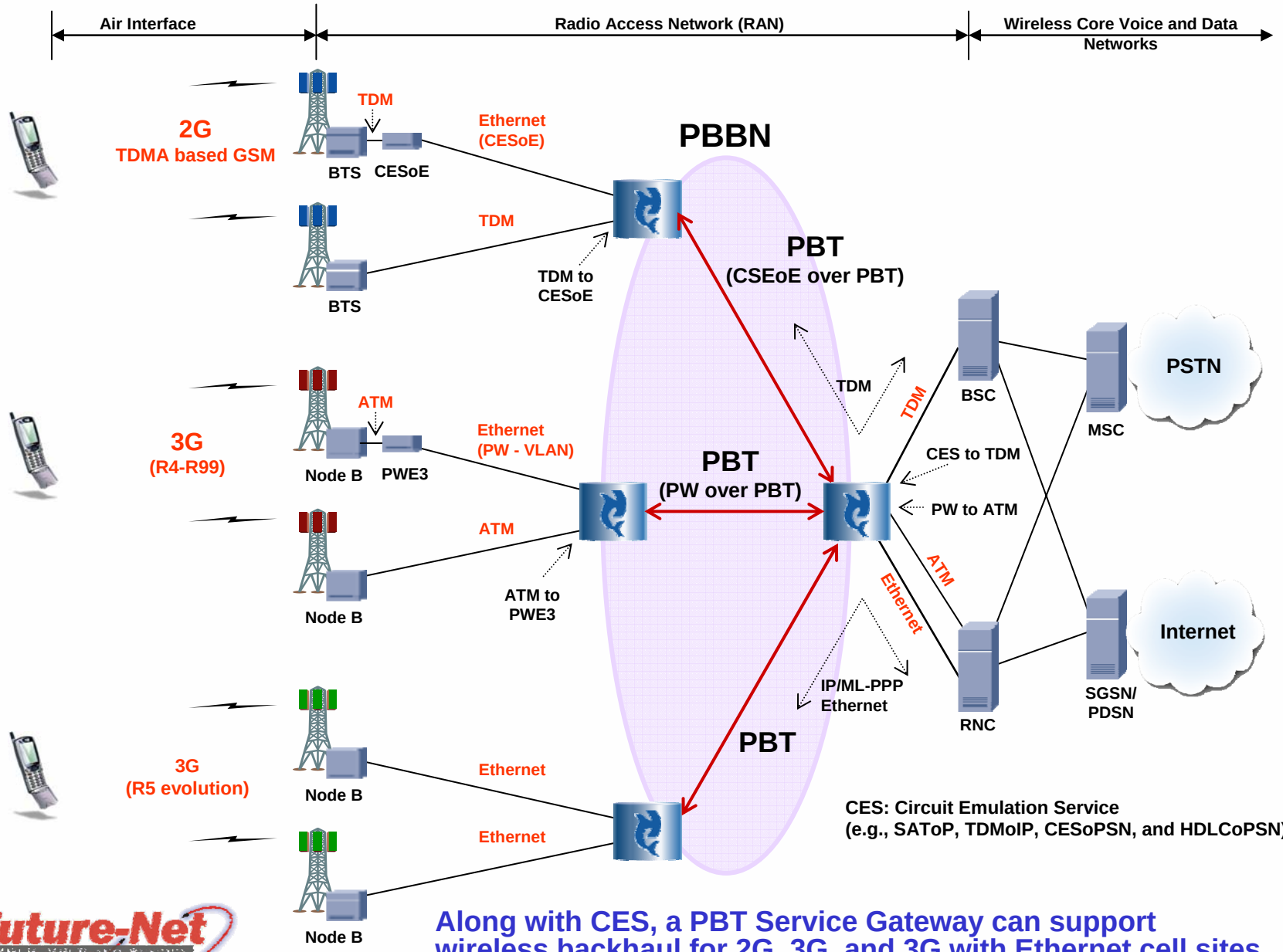
Wireless Backhaul over PBT



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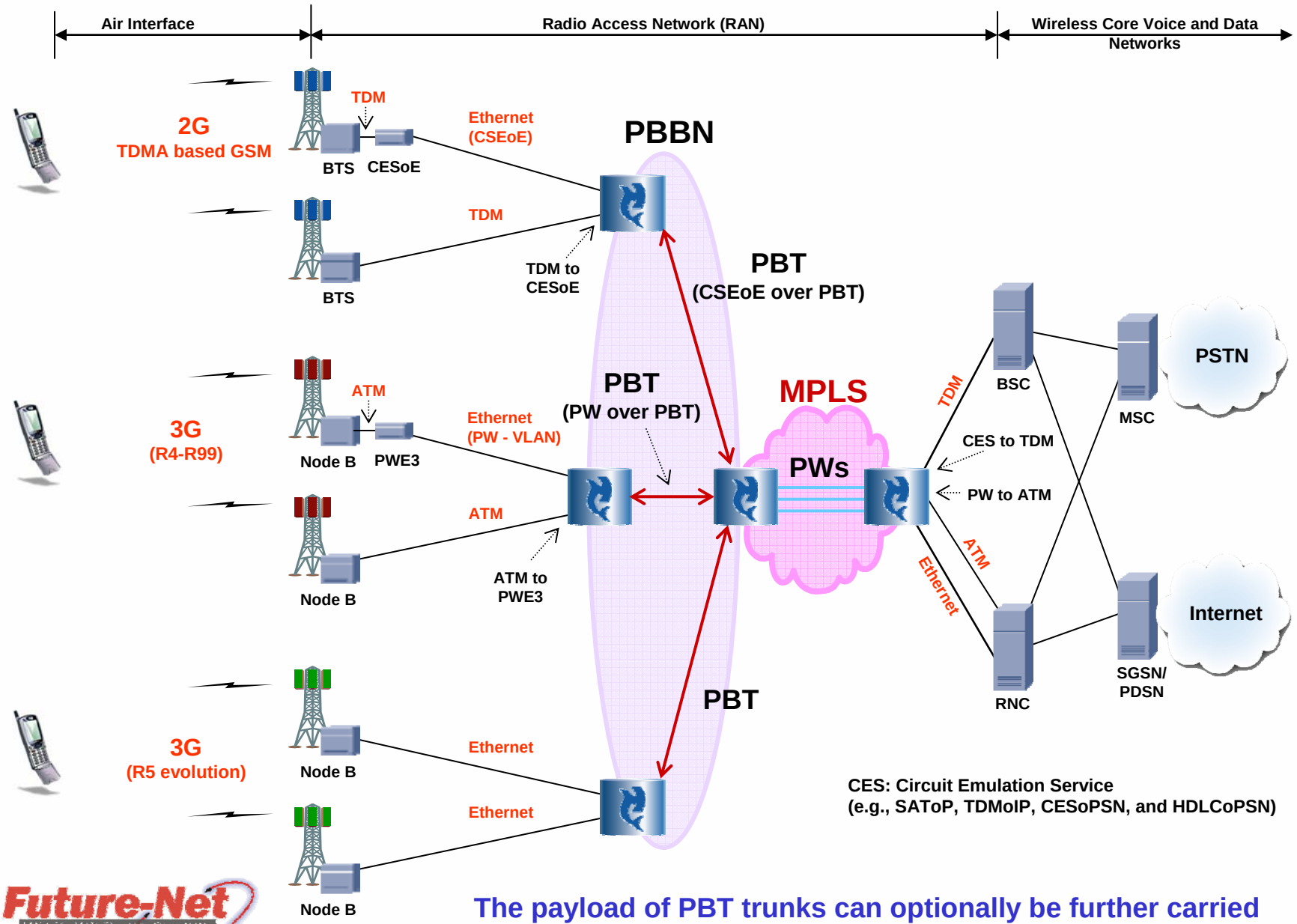
Along with CES, a PBT Service Gateway can support wireless backhaul for 2G, 3G, and 3G with Ethernet cell sites

Wireless Backhaul over PBT to remote BSC/RNC using IP/MPLS



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The payload of PBT trunks can optionally be further carried over an IP/MPLS network before reaching the BSC/RNC

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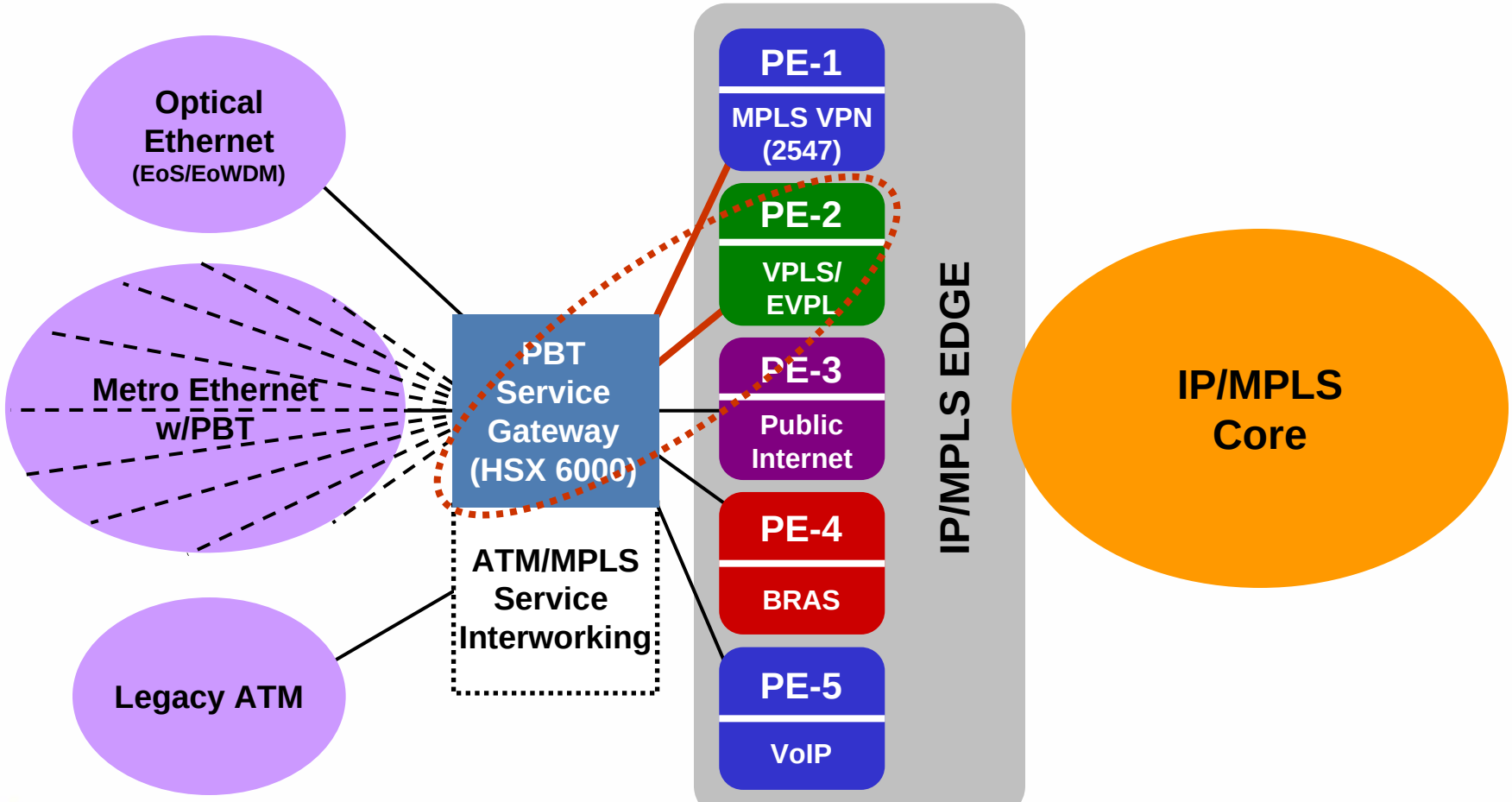
HSX 6000 – The 'Glue' That Ties it All Together



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PBT Service Gateway whitepaper
http://www.hammerheadsystems.com/solutions/whitepapers/index.html

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